

Appl. No. 09/895,524
Reply to Office action of 10/26/2004

HDP liner layer, wherein a portion of the HDP liner layer over metal leads has sloped edges, forming a gap-fill layer over the liner layer, and forming a dielectric layer over the gap-fill layer. The AAPA teaches both a liner layer and a gap fill layer, but does not teach the liner layer being a HDP liner layer with a portion over the metal leads having sloped edges. Ngo and Yao teach HDP gap fill layers, but not HDP liner layers.

The Examiner argues that Ngo teaches an HDP liner layer 30 and a gap-filling TEOS layer 30 at Col. 5, lines 13-17. Applicant disagrees. Ngo teaches at col 5, lines 8-17 "gaps between the metal features . . . are filled . . . by depositing a suitable gap filling material, such as an HDP oxide employing HDP-chemical vapor deposition." Ngo then goes on to teach the optional deposition of TEOS similar to the dielectric layer over the gap fill layer of the claimed invention. Ngo clearly teaches that the HDP layer is the gap-fill layer, not a liner layer in addition to a gap fill layer as argued by the Examiner.

At most, Ngo and Yao would suggest replacing the gap fill layer of the AAPA with an HDP layer or replacing both the liner and gap fill layer of the AAPA with a single HDP gap fill layer. There is no suggestion provided by the prior art for replacing the liner layer of the AAPA with an HDP liner layer where a portion of the HDP liner layer over metal leads has sloped edges while retaining a gap fill layer as claimed. The combined references do not disclose or suggest to one of ordinary skill in the art forming the three claimed layers: (1) a HDP liner layer, wherein a portion of the HDP liner layer over metal leads has sloped edges; (2) a gap-fill layer over the liner layer; and (3) a dielectric layer over the gap-fill layer. Accordingly, Applicant respectfully submits that claim 1 and the claims dependent thereon are patentable over the AAPA in view of Ngo and Yao.

The Examiner rejected claim 2 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in combination with Ngo et al '263 and Yao et al '564 as applied to claims 1, 3, 5 and 12 above, and further in view of the following comment: One of ordinary skill in the art would have been led to the recited gate thickness, and thereby the recited angle

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of inclination of the surface of the gap-fill layer through routine experimentation to achieve a desired device density and desired device properties on the finished wafer.

Applicant respectfully submits that claim 2 is patentable over the references for the same reasons discussed above relative to claim 1, from which claim 2 depends.

Applicant respectfully submits that claim 2 is further patentable over the references as there is no disclosure or suggestion in the references of the sloped edges of the HDP liner layer having a slope of about 45°. Furthermore, neither Ngo nor Yao provide any suggestion for the controlling the slope of the HDP edges. The Examiner argues that the recited angle would have been achieved through routine experimentation to achieve device density and desired device properties. However, these references do not teach or suggest a relationship between the slope of the HDP layer and density or other desired device properties. Thus, more than routine experimentation with the processes of the prior art is needed to accomplish the claimed invention.

The Examiner rejected claim 6 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in combination with Ngo et al '263 and Yao et al '564 as applied to claims 1, 3, 5 and 12 above, and further in view of Bothra et al '102.

Applicant respectfully submits that claim 6 is patentable over the references for the same reasons discussed above relative to claim 1, from which claim 6 depends.

The Examiner rejected claim 8 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in combination with Ngo et al '263 and Yao et al '564 as applied to claims 1, 3, 5 and 12 above, and further in view of Aug et al.

Applicant respectfully submits that claim 8 is patentable over the references for the same reasons discussed above relative to claim 1, from which claim 8 depends.

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The Examiner rejected claim 9 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in combination with Ngo et al '263 and Yao et al '564 as applied to claims 1, 3, 5 and 12 above, and further in view of Tsai et al.

Applicant respectfully submits that claim 9 is patentable over the references for the same reasons discussed above relative to claim 1, from which claim 9 depends.

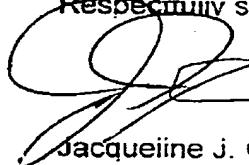
The Examiner rejected claim 10 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in combination with Ngo et al '263 and Yao et al '564 as applied to claims 1, 3, 5 and 12 above, and further in view of Wolf.

Applicant respectfully submits that claim 10 is patentable over the references for the same reasons discussed above relative to claim 1, from which claim 10 depends.

Applicant notes that there is no listed rejection for claims 4, 7, or 11.

In light of the above, Applicant respectfully requests withdrawal of the Examiner's rejections and allowance of claims 1-12. If the Examiner has any questions or other correspondence regarding this application, Applicant requests that the Examiner contact Applicant's attorney at the below listed telephone number and address.

Respectfully submitted,



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